VARNISH FOR PRINTS, ETC.—The following varnishes are used for prints, engravings, or maps: (1) A piece of plate glass is heated, and, while yet warm, a little wax rubbed over it; water is then poured over the plate, and the moistened picture laid thereon and pressed closely down by means of a piece of filtering paper. When dry, the picture is removed, and will be found to possess a surface of great brilliancy, which is not injured by the process of mounting. (2) Boil Ohio turpentine till brittle, powder and dissolve in oil of turpentine. (3) Canada balsam and clear white resin, of each 6oz. oil of turpentine 1 quart. dissolve. (4) Digest gum sandarach, 21 parts; gum mastic, 8; camphor, 1; with alcohol, 48. The map or engraving must previously receive one or two coats of gelatine.

Another.—Take up the carpet, well smooth the boards by plane and sand paper, then apply the following stain, using a large paint brush; an old brush is best. When the stain is dry; the floor may be oiled with linseed oil, and well rubbed with an old flannel wrapped round a piece of wood, or, if preferable, may be varnished with copal varnish, or blown hard varnish. To make the stain, procure 1 oz. Vandyke brown oil, 4 oz. of pearlash, 2 drms. best dragon's blood; put the whole of the ingredients in a clean pan or jug, add five half pints boiling water, well stir the contents with a piece of wood; bottle for use. It may be used hot or cold, but will not stain a greasy surface.

FIREARMS frequently burst when the muzzle has been accidentally closed with earth, snow etc. Prof. Forbes' explanation of this fact is very simple. If the charge moved slowly, a very slight pressure of the air in the barrel would be sufficient to clear the muzzle, but as the charge actually travels with a speed greater than the velocity of sound, the resistance offered by the obstacle becomes excessive and the gun bursts. It has been demonstrated mathematically, that the pressure generated by the plug of the density of air is seven and a half tons.

COMPOSITION FOR POOL BALLS.—A good and inexpensive composition that would be hard enough for pool balls may be made as follows: Melt together over a gentle fire in an iron pot, pitch 1 part, gutta-percha 2 parts, orange shellac 5 parts; add to this 6 parts of white lead (lead carbonate) in impalpable powder, and stir until a perfectly homogenous mixture is obtained, then cast and turn out. Color with the aniline dyes mixed with dilute alcoholic solution of bleached shellac.

COATING COPPER WITH IRON.—Professor Bœtger reccommends the following solution for coating copper plates with iron. Ten parts of ferro-cyanide of potassium and twenty parts of tartrate of soda are dissolved in 220 parts of distilled water, adding a solution of three parts sulphate of iron in fifty parts of water. Caustic soda solution is then poured into the mixture until the Prussian blue formed is re-dissolved.

GILDING WRITING.—First paint the table, and let it stand for two or three days to dry, then, before writing, take some very dry white lead or whitening, put into a bag of muslin, then shake it lightly over the table where the writing is going, then blow it off afterwards. Get some quick drying gold size and write the letters with it, then put gold leaf on very lightly.

Another method:—Paint the table, let it dry, dust over with dry powdered whiting (tied up in a piece of muslin), write with old size what he want, let it almost dry, and he can put on his gold leaf; wash off the table and varnish. Paint for writing is prepared the same as any other, only you would rub it a little finer if anything.

SILVERING METALS WITHOUT HEAT.—Cleanse the metal well, cover it equally with salt water and a mixture of one part of precipitated chloride of silver, two parts of potassa alum, eight parts of chloride of sodium, and eight parts of cream of tartar. Then wash the metal with water and dry it with a soft woollen rag.

POLISH.—To put on a good polish for black walnut tables used either for hot or cold water, use a cloth cushion moistened with clear solution of 1 part shellac in about 10 parts of alcohol, applying a few drops of linseed oil to the cushion occasionally during the operation of polishing.

To put a polish on fine walnut furniture, mix with two parts of good alcoholic shellac varnish, 1 part of boiled linseed oil, shake well, and apply with a pad formed of woollen cloth. Rub the furniture briskly with a little of the mixture until the polish appears.

IVORY may be silvered by immersing it in a weak solution of chloride of silver and letting it remain till of a deep yellow colour; then take out and dip in water, after which expose to the sun's rays until black. On rubbing, the black surface will soon change to a silver.

NOTES ON BELTING.

[TEXTILE MANUFACTURER]

The formula given below is based on the experience of engineers in Great Britain, America and France. It serves the purpose of showing what width of belt will do the required work most efficiently, and at the same time last the maximum number of years. Many engineers, more especially in this country, are content to provide belts of greatly reduced width, and of single substance instead of double; hence the frequent complaints of their stretching, breaking and lasting so short a time. As a matter of convenience and arrangement of machinery, a narrower belt than that which is shown by the generally accepted formula is often imperative; but, in the absence of any such conditions, it is questionable economy to depart materially from it. The following may be regarded as an axiom: To use a belt of ample width and substance for the work required is to secure for it a long existence with satisfaction to all concerned.

DIRECTIONS FOR CALCULATING THE WIDTH OF BELTS REQUIRED FOR TRANSMITTING DIFFERENT NUMBERS OF HORSE POWER.

Multiply 33,000 by the number of horse power to be transmitted; divide the amount by the number of feet the belt is to run per minute; divide the quotient by the number of feet or parts of a foot in length of belt contact with smaller drum or pulley; divide this last quotient by six, and the result is the required width of a single-tanned leather belt in inches.

Explanations.—The figures 33,000 represent the number of pounds a horse is reckoned to be able to raise one foot high in a minute. To obtain the number of feet a belt runs per minute, find the number of revolutions per minute of the driving shaft and multiply by the circumference of the drum, which is always 3.1416, its diameter. This final division by six is because half a pound raised one foot high per minute is allowed to each square inch of belting in contact with the pulley; a pound must therefore be allowed to two square inches, or six pounds to a strip one foot long and one inch broad.

Example.—Required the width of a single belt, the velocity of which is to be 1,500 feet per minute; it has to transmit ten horse-power the diameter of smaller drum being four feet, with five feet of its circumference in contact with belt:

33,000x10=330,000 divided by 1,500=220 divided by 5=44 divided by 6=7⅓ inches, the required width of belt:

DIRECTIONS FOR CALCULATING THE NUMBER OF HORSE-POWER WHICH A BELT WILL TRANSMIT.

Divide the number of square inches of belt in contact with the pulley by two; multiply the quotient by the velocity of the belt in feet per minute; again divide the total by 33,000, and the quotient is the number of horse power.

Explanations.—The early division by two is to obtain the number of pounds raised one foot high per minute, half a pound being allowed to each square inch of belting in contact with the pulley.

Example.—A six-inch single belt is being moved with a velocity of 1,200 feet per minute, with four feet of its length in contact with a three-foot drum. Required the horse power:

6x48=288 divided by 2=144x1,200=172,800 divided by 33,000 =say 5¼ horse power.

It is safe to reckon that a double belt will do half as much work again as a single one. Belting made from "Helvetia" leather is much stronger, and will bear a heavier strain than that made from ordinary tanned leather.

HINTS TO USERS OF BELTING.

1. Horizontal, inclined and long belts give a much better effect than vertical and short belts.

2. Short belts require to be tighter than long ones. A long belt working horizontally increases the grip by its own weight.

3. If there is too great a distance between the pulleys, the weight of the belt will produce a heavy sag, drawing so hard on the shaft as to cause great friction at the bearings; while at the same time the belt will have an unsteady, flapping motion, injurious to itself and to the machinery.

4. Care should be taken to let belts run free and easy, so as to prevent the tearing out of lace holes at the lap; it also prevents the rapid wear of the metal bearings.

5. It is asserted that the grain side of a belt put next to the pulley will drive 30 per cent. more than the flesh side. Experience can alone verify this; but when belts are required to be worked this way, the fact should be stated in the order, so that the riveting may be arranged accordingly.